

## Letter and enclosure from Eliza Symonds Bell to Alexander Graham Bell, June 20, 1875, with transcript

Copy of letter from Mrs. Alexander Melville Bell to her son, Alexander Graham Bell June 20, 75 Brantford, Ont., Can., Home, June 20th, 75 (Prof. A. Graham Bell, Care of Mrs. Saunders, 292 Essex Street, Salem, Mass. U. S.) My dear Aleck,

The time is drawing near when you are usually home, and we hoped before this to have heard from you with reference to the probable time when we may look for you. Your affairs are still going on well we trust, and your health as good as when you last wrote. We heard last week from Edinburgh. Your cousins had been most fortunate in not only letting but in selling their house, and for fully as much as their Father gave for it 25 years ago. Their furniture brought as much as will pay their passages out here, and all the money in the Bank has been delivered into their hands. We expect they will bring out nearly 900 pounds. They are only waiting till some law papers which they had to sign were ready, and they are most likely now upon the water. We shall probably hear this week by what ship they are coming. I very much wish some good Samaritan would take the thought of seeing them and their luggage safely on board. Fearing they may get bewildered in the confusion, and lose some of their luggage. I wish we had named this to Mr. Anderson, though Mary has a head and has traveled a little. Papa had a long letter from Mr. Cram. Poor fellow, he is rather isolated up at the mines and craves sadly for news from this quarter. He gives a description of his journey and surroundings which is very interesting. Papa has handed the particulars over to the Expositor, and we will send you a copy.

We have not seen Carrie since I wrote last, perhaps she and George may look in today, if they are at church. By the way Aileen is now organist at Grace Church.

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The news from poor Sophie we fear, is anything but cheering, they seem very dull about her. We fear she will have cause to "rue the day he taught her". Cannot say what her Sisters are about, but two of the Brantford beaus are in constant attendance. The Friday evenings are still kept up, as well as the close intimacy with the Miss Rs. The last appear to me to be very milk and water young ladies. I don't know if they are so in reality. Charlie is still at large. I fancy the habits of your Scotch and Irish cousins will not harmonize very closely. The woman servant who I told you of before, is still here and has given me a good rest. If her son can get employment anywhere near, she will stay. She does not wish to lose sight of him, and indeed there may be need for her oversight, for he is anything but industrious. Uncle David had the lad in Town to chop wood for a few days, and he did as much in a day as an ordinary chopper (William for instance) would do in an hour. The place is looking very lovely just now, though the flowers are late in blooming. We have a good promise for fruit, if only the skies would melt a little. There are great complaints for want of water, and our rain tanks even now are dry. The river is so small it looks as if it was drying up also. (Monday) Carrie and George were here last evening, both quite well, he especially is greatly improved since his marriage. C. is wild for a piano, and we fear she will expend a great part of her nest egg in the purchase of one. George it seems, being a member of the Grange, a sort of freemasonry, can obtain new instruments at 50 per cent discount! or thereabouts. I have no time to write another word, so with fond love and the hope of soon hearing from you, in which Papa unites, I am, dear Aleck,

Your affectionate Mother, E. G. Bell

## SCIENCE

### RAIN-FALL OVER THE BRITISH ISLES.

The report of the rain-fall over the British Isles for the year 1874, compiled by Mr. G. J. Symons, from the observations carried on at about 1,700 stations, has recently been published. The result is 34.28 inches, and the most remarkable rain of the year occurred

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on October 6th. At about eighty stations the fall for that day exceeded two inches; at twenty-eight stations it exceeded three inches; at Little Langdale it exceeded four and a-half inches- and at Bryan Gwynant it was four and a-half inches. The average rain-fall for the years 1850–9 was 32.12; for the years 1860–9, 35.74 inches. A comparison of the above results with those obtained at Toronto (counting ten inches of snow as one of rain) exposes a popular fallacy respecting the climates of Great Britain and Canada. The average of thirty-three years at Toronto, ending with 1873, was 36.08 inches, and the greatest amount of rain that fell in one day (Sept. 14, 1843) was a little less than three and a-half inches, falling short of the Little Langdale maximum by more than an inch. Of the above average for Toronto only 29.17 inches consisted of rain, the remaining 6.91 inches representing an average snow fall of 69.1 inches. These figures show that at Toronto a somewhat larger amount of water, in one form or another, reaches the earth than in the British Isles, and that the greatest rainfall for a single day here falls considerably short of that observed at stations in England and Ireland.

### **THE ELECTRIC BAND.**

Among ingenious inventions called forth among our enterprising neighbours by the approaching Centennial Exhibition is an automatic band which plays off a written score by means of electricity. The sheets containing the music are drawn underneath a row of “feelers” charged with electricity. The musical notes are pointed with a metallic substance on paper, which is, of course, a non-conductor. By this means currents are established between the notes and the performing part of the machine, which latter is said to consist of drums, cymbals, flutes, hautboys, etc, with an organ accompaniment. Two young Philadelphians have devoted four years to the perfection of this instrument, and its execution has proved highly satisfactory to those who have witnessed its exhibition.

### **DISTRIBUTION OF ANIMALS.**

The important bearing upon the theory of evolution of the present distribution of animals over the earth is well known, as well as the fact that one of the ablest supporters of Darwinism, Mr. B. R. Wallace, has for some years been devoting his attention to the subject. His long-expected work will be published in the autumn by Messrs. MacMillan & Co., and will consist of two octavo volumes, illustrated by maps and plates representing groups of the animals characteristic of each of the zoographical sub-regions. This work promises to be one of the most important contributions to the science of the present day.

### **SPECTRA OF THE FAINT STARS.**

Vogel has been for some time occupied with the spectroscopic examination of faint stars, and he has found that some of these are distinguished by spectra which are sharply defined at the violet side, but are broken up on the red side into gradually diminishing bands. These stars are generally red. The discontinuity of these spectra, according to Vogel's view, is brought about by bright bands of absorption, the discontinuity being only apparent, and being the consequence of the absorption of the rays of light by the atmospheres of the stars. He divides stars into three classes:—1. Stars whose temperature is such that the metallic vapours contained in their atmospheres can exert only a very slight absorptive effect. 2. Stars whose atmospheres, as in the case of our sun, are distinguished by powerful absorption, due to vapourized metals. 3. Stars whose temperature is so lowered that the materials which compose their atmospheres can combine together.

### **THE KEELEY MOTOR.**

#### **A DESCRIPTION OF THE MACHINE AND ITS ALLEGED POWERS.**

"It is the greatest invention of this or any other age," says the New York Tribune's correspondent at Philadelphia. "It furnishes the power that will do the future work of the

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world—a power generated without expense, by a simple mechanical contrivance, without the aid of heat, chemicals, or electricity.”

The subject was the “Keeley motor,” and the speaker a man who formerly acted with credit in public life in Washington, and has more recently gained a reputation for able-literary work—not the sort of person at all to be carried away by enthusiasm for an impracticable invention or deceived by a mechanic's trick.

“Your faith in this marvelous thing gives me just a glimmering of confidence in it,” I answered. “I shall no longer dismiss the extraordinary reports afloat about Mr. Keeley's machine as unworthy of notice. Pray tell me upon what information you base your belief that your friend has discovered a new and mysterious force?”

“Upon personal knowledge. I have witnessed his experiments for more than three years. I have not only seen the operations of this force, but believe I have some conception of the scientific principle that underlies it.”

“And do you mean to say that by passing a few gills of water through a collection of hollow cylinders and pipes, an expansive power greater than that of steam is created?”

“I do. Air and water are all that go into the generator, and with these materials, by means purely mechanical, a pressure of 1,000 tons is produced in less than ten seconds' time.”

“You might as well tell me that you have a combinations of levers by which you can lift yourself over the *Tribune* tower in New York by your boot-atmps. What you say is absurd.”

“That I admit,” replied the advocate of the new motor. “All scientific men say it is impossible that the machine should do what we claim—but then it does it all the same. In ten minutes it will produce power enough to run a 15-horse power engine for 24 hours.”

“Let me catechize you a little.”

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“Very well, but there are some questions I have no right to answer,” said the gentleman with a positiveness that showed he meant to be on his guard.

“Is the expansive force a gas?”

“No; we call it a vapour. At low pressures, or rather on ‘low lines,’ as we say, for we have to coin expressions to apply to entirely new phenomena, it is opaque like steam, condenses to water as rapidly as steam, and has about the same specific gravity; but on higher lines it is as dry as the atmosphere, invisible, tasteless, odourless, and non-inflammable. It is also enduring, and has been kept in receptacles five weeks at a time without losing any of its energy. In fact it could be stored up for years and possess just as much energy when freed as when first confined.”

“What amount of pressure can be developed from a given quantity of water?”

“Three hundred tons from a single gill is a near enough approximation. Mr. Keeley has never ventured to extract the utmost possible force.”

Pursuing my line of cross-examination, I asked if a look at the inside of the “multiplier” as the force-generating engine is called, would reveal the principle upon which it works.

“After you had examined it you would know no more than before,” he replied. “The vitality of the machine lies in a little apparatus which could be put in the waistcoat pocket, and as the principle governing its action is entirely beyond the present ken of science, an examination of the mechanical device would not be likely to give a clue to the secret.”

“Have you any objection to telling what led Mr. Keeley to make the discovery?”

“No objections whatever. Some time ago, after many years of experimenting, Mr. Keeley constructed what he called the hydropneumatic-pulsating-vacuo-engine—an invention

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“Have you any objection to telling what led Mr. Keeley to make the discovery?”

“No objections whatever. Some time ago, after many years of experimenting, Mr. Keeley constructed what he called the hydro-pneumatic-pulsating-vacuo-engine—an invention sufficiently wonderful in itself to have given him a world-wide reputation, but although a prodigious advance beyond the steam engine, it was as a dwarf to a giant relatively to the discovery to which its workings led. I first saw this machine in 1872, in the bath-room of Mr. Keeley's house on Ogden-street, in this city, which he had turned into a workshop. It was a small vertical engine, of three-horse power, operated by the pressure of air and water in connection with a vacuum chamber and a cylinder. The device for producing a vacuum and shifting its operation from the chamber to the cylinder and back, was of such ingenuity as to stamp Mr. Keeley as a man of the highest order of inventive genius. To set this engine in motion the first operation was to exhaust the air from a vertical drum with an air pump. Water was then let into the lower part of the apparatus from the hydrant through a small gutta-percha tube which had been cut in two and joined by a goose-quill, to better show how small the stream was. Within three minutes the fly-wheel was revolving with extraordinary velocity. The motion of the piston was surprisingly regular and smooth, and there was no noise except a peculiar plunging sound as the piston descended into the cylinder. I was greatly impressed with this singular machine. The absence of fire and all the surroundings we are accustomed to hear, see, and smell in connection with steam engines invested it with an almost supernatural character, and I had a half apprehension that it would walk off, or strike me down, or do some other desperate or devilish thing. While experimenting with this invention Mr. Keeley discovered that he had not dreamed of. He abandoned his original plans and began investigating the new spirit which he had summoned from Nature's laboratory. At last he found out how to generate the new force and tried to test its power. He applied it to a gauge that measured 500 pounds to the square inch, but the unknown force broke it in pieces. Then he got a 2,500 pound gauge,

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with no better success. Afterward he made a force-register, with compound levers, and found that his new power exerted a pressure of about 10,000 pounds to the square inch.

My informant went on to describe the inventor's efforts to subdue the demon he had raised and make it work tractably. At first he had to take his multiplier apart every time he made an expulsion of power. The first necessity was to make it automatic in its workings, so that it would furnish a steady supply of force. This was accomplished only very recently. An engine of peculiar construction, adapted to be propelled by the new motor, was next designed and made. When this apparatus was completed and worked satisfactorily, the next step was to build a larger one, to demonstrate beyond question the utility of the force to do the work of steam. On this Mr. Keeley is now engaged. The engine will be of 170-horse power. In a few weeks it will be completed and if his patents in this and foreign countries are secured by that time, as is expected, a public exhibition of the motor will be given.

"Why surround the invention with such a veil of mystery?" I asked, after my friend had told me all he was willing to tell. "The secretiveness of everybody connected with the concern strengthens the suspicious of humbug to which their marvelous stories naturally give rise."

"The discovery is of too great importance to be divulged until it has been protected by patents in every country in which it can be patented. The best proof to outsiders that it is not a humbug is that nobody is trying to sell any stock of the company which owns the invention. Those who are so lucky as to possess the stock, instead of wanting to part with it, are annoyed by the solicitations of parties who want to be 'let in.'"

### **A NEW MOTOR.**

There have been rumours for some time back of a new motor which would revolutionize our ideas of space. How many many years and dreamy hours have been wasted in the vain search for perpetual motion, and perpetual motion has been pronounced impossible, on grounds which must disappear if such an invention as this spoken of should turn out



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a reality. That men should spend money on anything is one of the surest tests of faith, and we know as a fact that \$7,000 has been paid for one of the shares of the Company about to bring this matter out, though the original price was only \$1,000. According to the *Chicago Tribune*, within thirty days a train of Pullman cars will be drawn from Philadelphia to New York without steam, electricity, hot air, "or any other motive power." The whole matter has, it seems, been placed by the inventor in the hands of a stock company composed chiefly of Philadelphia and New York capitalists, who, holding stock to the nominal value of \$1,000,000, have already paid in \$250,000. Though perfectly sanguine of success, they are not in the possession of the secret of the inventor. Through a machine of 36 inches high, 24 long, and 13 wide, a pressure of 2,000 to 25,000 pounds is said to have been attained. One of the promoters has been interviewed in New York, and he says that by passing a few gills of water through a collection of hollow cylinders and pipes an expansive power greater than that of steam is created—a pressure of 1,000 tons being produced in less than ten seconds. Such a statement, he admits, sounds absurd, but so would the statement that a message could be sent a thousand miles in a few seconds prior to the era of electric telegraphy.

Pressed as to what the expansive force is, he says it is not a gas, but "a vapour," and at low pressure it is "opaque like steam," and condenses to water as rapidly as steam, and has about the same specific gravity, but on high pressure it is "as dry as the atmosphere, "invisible, tasteless, odourless, and non "inflammable." It may be kept for any length of time without losing its energy. Three hundred tons of force can be developed from a single gill of water; and the "secret" of the machine, its "vitality," lies in a little apparatus which could be put into the waistcoat pocket. We confess all this seems "very like a whale," but yet we are not prepared to say that a great discovery has not been made.